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Prepn. of poly:oxy:tetra:methylene:glycol efficiently - by polymerising tetra:hydro:furan in presence of solid catalysts of composite metal oxide and carboxylic acid anhydride, used for e.g. engineering plastic

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Prepn. of polyoxytetramethyleneglycol comprises polymerising tetrahydrohuran in presence of both:

(a) solid catalysts composed of composite metal oxides of the formula (I), and

(b) carboxylic acid anhydrides.

$$M_xO_y \quad (I)$$

M = metal; and
x and y = 1,2 or 3.

ADVANTAGES/USES

The solid catalyst is easily recovered from the reaction mixt. and reactivated. The polyoxytetramethyleneglycol (POTG) is obtd. easily and is used as a raw material for polyurethanes, polyetheresters, polyether-(ester)amides, surfactants, or engineering plastics or for medical uses.

CATALYSTS

The catalysts pref. comprise metal oxides such as Al_2O_3, SiO_2, TiO_2, ZrO_2, WO_3 or ZnO_2. Pref. catalysts include Al_2O_3-SiO_2, SiO_2-TiO_2, SiO_2-ZrO_2 and TiO_2-ZrO_2.

The catalyst is prepd. as follows; (1) metal contg. -cpds. e.g. metal alkoxides, metal chlorides, metal oxychlorides are added to ammonia to ppte. composite metal oxides, and (2) the pptes. are crushed to particles (200-500 mesh pass) and calcined at 300-600°C.

EXAMPLE

Silica-alumina solid catalyst (alumina content = 70%) obtd. by calcining at 500°C for 4 hrs. in an air atmos. is packed in a piston-flow type reactor (dia. = 30mm; length = 200mm).

20ml/hr. of THF contg. 3.8 wt. % of acetic anhydride is fed at 40°C and polymsn. is carried out for 132 hrs. continuously to give 404.3g of polyoxytetramethyleneglycol diacetate (Mn = 1,020).

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The catalyst is removed from the reactor and washed with THF. After drying, the catalyst is charged to a tube (dia. = 30mm, length = 400mm) and calcined at 500°C for 7 hrs. under air.

THF is polymerised by the same way in presence of the reactivated catalyst to give 406.2g of polyoxytetramethyleneglycol diacetate (Mn = 1,060).

(5ppW156DwgNo0/0).

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